music

A composer who counts

Rising star Emily Howard talks to Richard Morrison about mixing music with maths

CHRIS MCANDREW FOR THE TIMES

It has been more than 40 years since I studied maths, and then it was only to A level. So when the composer Emily Howard starts waxing lyrical about the mysteries of negative curvature, in which there are triangles where the angles don't add up to 180 degrees, I start to feel as if I'm drowning in a sea of my own irredeemably Euclidean stupidity.

It's my fault. I am curious about Howard's latest piece, to be premiered by the London Symphony Orchestra and Simon Rattle in their season-opening concert tomorrow. Why, I ask her, is it called *Antisphere*? "Everyone knows what a sphere is," she replies. "It's always positively curved, whereas an antisphere is negatively curved. Think of the saddle on a horse."

I do. It doesn't help. Undaunted, Howard continues. "In negative curvature everything shrinks. So I started thinking about how I could translate this strange shrinkage into orchestral music. Could I take well-known musical objects, such as a major chord, and apply some strange shrinkage to them, whether by means of pitch, pulse or timbre?"

For example? "Well," she replies, "I take a circle of fifths [a rising or descending sequence in which the fundamental notes are a major-fifth apart] and turn it into a circle of four-and-three-quarters. To hear the LSO play those quarter-tones with amazing accuracy at high speed is incredibly exciting."

You won't be surprised to learn that Howard, a 40-year-old Liverpudlian, studied maths and computer science at Oxford University, even though at school she had shown just as much aptitude for composing music and played cello in the Wirral Youth Orchestra. "I was encouraged to do science as a 'sensible choice'," she says, "but I certainly don't regret doing it. There's something about the wonderful process of mathematics, about the sheer beauty of algorithms, that excites my mind creatively."

She firmly rejects the idea, however, that her audiences need a comparable grasp of higher mathematics to appreciate her pieces, even though nearly all of her orchestral works (such as the tumultuous *Torus*, acclaimed at the Proms three years ago) carry scientific titles.

"You can appreciate music on many different levels," she says. "You can listen just for the aural experience. After all, there are so many pieces in music history where you have no idea of what was in the composer's mind. It's simply that I need a mathematical stimulus to trigger a musical process in my brain. If I didn't do all the strange things I get up to with algorithms, the pieces wouldn't exist."

It's worth pointing out that, for all the science behind the notes, Howard's two most recent big pieces — both glowingly reviewed in *The Times* — have dealt with very emotional subjects. One was the opera *To See the Invisible*, premiered at last year's Aldeburgh Festival in Suffolk. That was a satirical parable depicting a bleak world in which people who don't conform to societal norms, perhaps because they are mentally ill, are condemned to become invisible for a year.

The other work, hurled out by 325 performers at this summer's Manchester International Festival, was an even more powerful social statement. *The Anvil: An Elegy for Peterloo*, was a 36-minute oratorio depicting the horrific massacre of political campaigners on the streets of Manchester in 1819. Reviewing it in *The Times*, Geoff Brown praised Howard for her "ferocious skills, instrumental panache and confidence".

So it's not all about algorithms. Nevertheless, Howard's next two projects are very much grounded in her scientific background. At the Barbican Centre in London on November 2 she curates an evening of words and music devoted to Ada Lovelace. This remarkable woman — Byron's abandoned daughter, who died in 1852 at the age of 36 — was a brilliant intellect who is now credited as the first person to recognise the true computing potential of Charles Babbage's analytical engine. Howard admits to having being obsessed with her for years, and the evening will include music (composed by Howard and others) that has been inspired by Lovelace, as well as talks by artificial-intelligence experts and mathematicians.

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If that event manages to bridge the worlds of music and maths for a single evening, Howard's other venture is a much more substantial step in the same direction. She and the ubiquitous Oxford mathematician Marcus du Sautoy have co-founded a centre for practice and research in science and music, or PRiSM for short. Based at the Royal Northern College of Music in Manchester, and backed by nearly £1 million from Research England's Expanding Excellence in England Fund, its aim is to spark a fruitful relationship between mathematicians, AI experts, software engineers and musicians.

"It's early days yet," Howard says, "but I hope it will be like a lab, with synergy and dialogue all the time between musicians and scientists. As with everything I do, it's the collision of disparate ideas that most excites me."

***Antisphere* is performed by the LSO at the Barbican, London EC2 (020 7638 8891), tomorrow. The Ada Lovelace evening is at Milton Court Concert Hall, EC2 (same booking number) on Nov 2**